

## NCM Zeiss Libra TEM driver license Checklist

User:

Approver:

Date:

### 1. Safety

Understand emergency shut down procedure	
Know emergency contact numbers	
Know where liquid N2 protective equipment is	
Know where the operating instructions are	
Check the log book for recent comments on instrument status	
Find your current user level on the approved operators list	

### 2. Prepare the TEM for your session

Check Gun Valve closed and CCD in cooling	
Check all vacuum levels in normal range	
Check HT on at 200kV and FEG on	

### 3. Fill up LN2 in ACD

Check glass window covered	
Wear protective gear (goggles, mask, gloves) and pour safely using ladder and refill every 4 hours	

### 4. Load specimen in holder

Know type of holders	
Remove holder from pre-pumping position in microscope	
Place holders properly on provided stand	
Load sample and tighten retaining screw (mini-type) gently	
Check sample snugness by gently tapping the big end the holder	

### 5. Insert holder

Check column vacuum is below $6 \times 10^{-7}$	
Check holder position X and Y sets at zero and all tilts at zero	
Insert sample to pre-pumping position	
Wait until red light goes off	
Rotate and insert holder into column properly	

## 6. Start filament

Wait until column vacuum is below $5 \times 10^{-7}$	
Check all vacuums are in green region, and HT and FEG stay on	
Open the column valve	

## 7. Carry out basic alignments

Find beam and sample edge	
Set eucentric height	
Insert and adjust a condenser aperture	
Current centering	
Adjust objective stigmation	
Insert objective aperture and center	
* Using objective aperture on phase plate requires separate training	

## 8. TEM operation for EELS and energy filtered images (separate training and qualification required)

Insert and adjust fixed EF slits (variable EF slits require separate training)	
Acquire EELS spectra	
Energy filtered TEM imaging	

## 9. Recording images

Acquire images on CCD camera	
Understand CCD's upper limit of beam intensity	
Understand the difference between binning, image, diffraction, EELS etc	

## 10. Shut down

Know shut down procedures	
Remove all apertures used	
Reset delta E to zero, and reset Ill Shift	
Close gun valve	
Reset center X & Y and tilts of holder	
Remove holder properly, unload sample and put in back to the pre-pumping position	
Cover window	

## 11. Record session in log-book

Fill out e-logbook and describe any problems	
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**A user can qualify to the following levels:**

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A user becomes a **C level** user when they have completed sit down training and can pass the drivers test. They can then sign up for daytime usage.

A user becomes a **B level** user once they have several trouble free sessions and who demonstrate responsibility for maintaining the microscope in best working condition. They may sign up for weeknight sessions.

A user becomes an **A level** user after several trouble free weeknight sessions and who demonstrate responsibility for maintaining the microscope in best working condition. They may sign up for evening and weekend sessions.